6399670

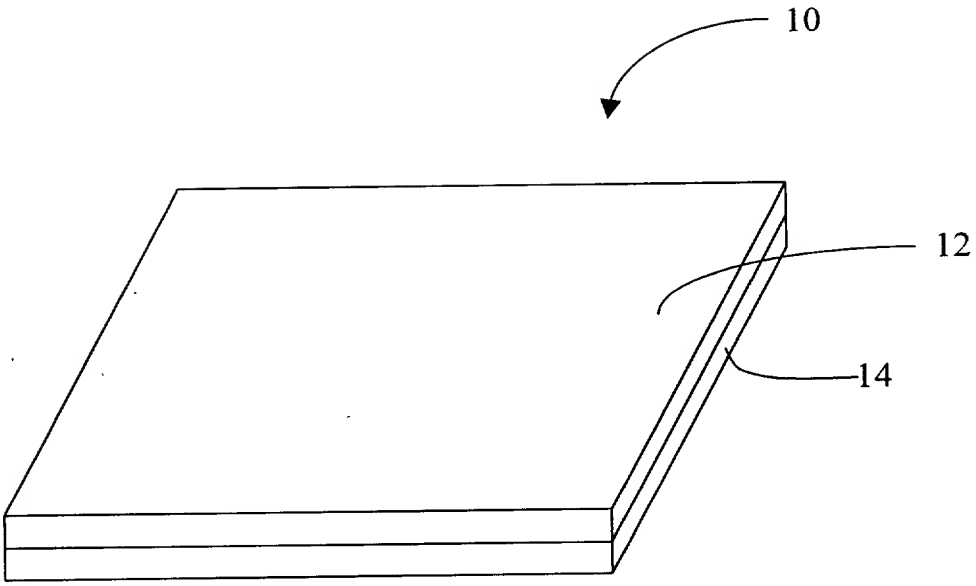


FIG. 1

FIG. 2

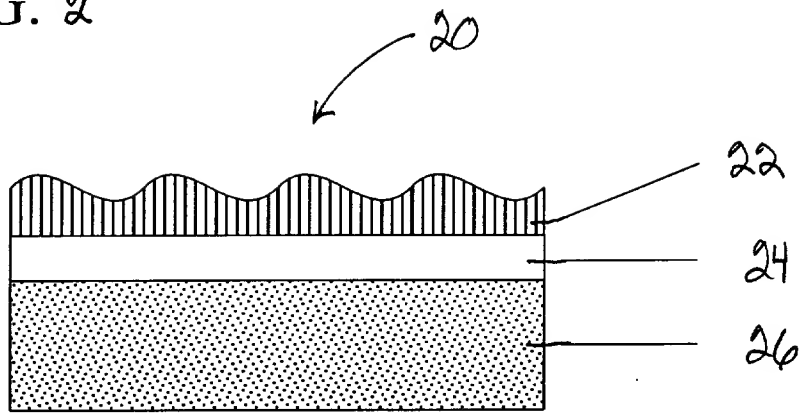
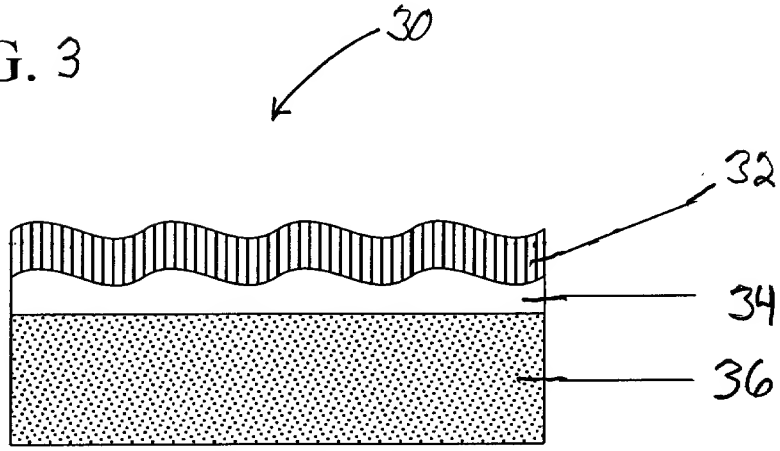


FIG. 3



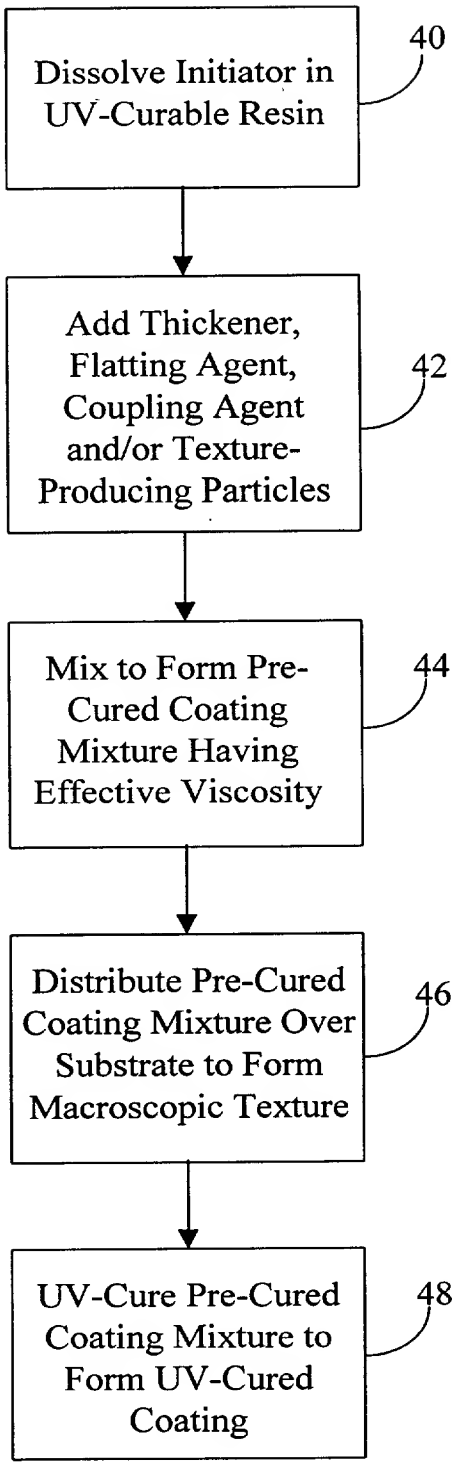

Dissolve Initiator in UV-Curable Resin
40
Add Thickener, Flatting Agent, Coupling Agent and/or Texture-Producing Particles
42
Mix to Form Pre-Cured Coating Mixture Having Effective Viscosity
44
Distribute Pre-Cured Coating Mixture Over Substrate to Form Macroscopic Texture
46
UV-Cure Pre-Cured Coating Mixture to Form UV-Cured Coating
48

FIG. 4

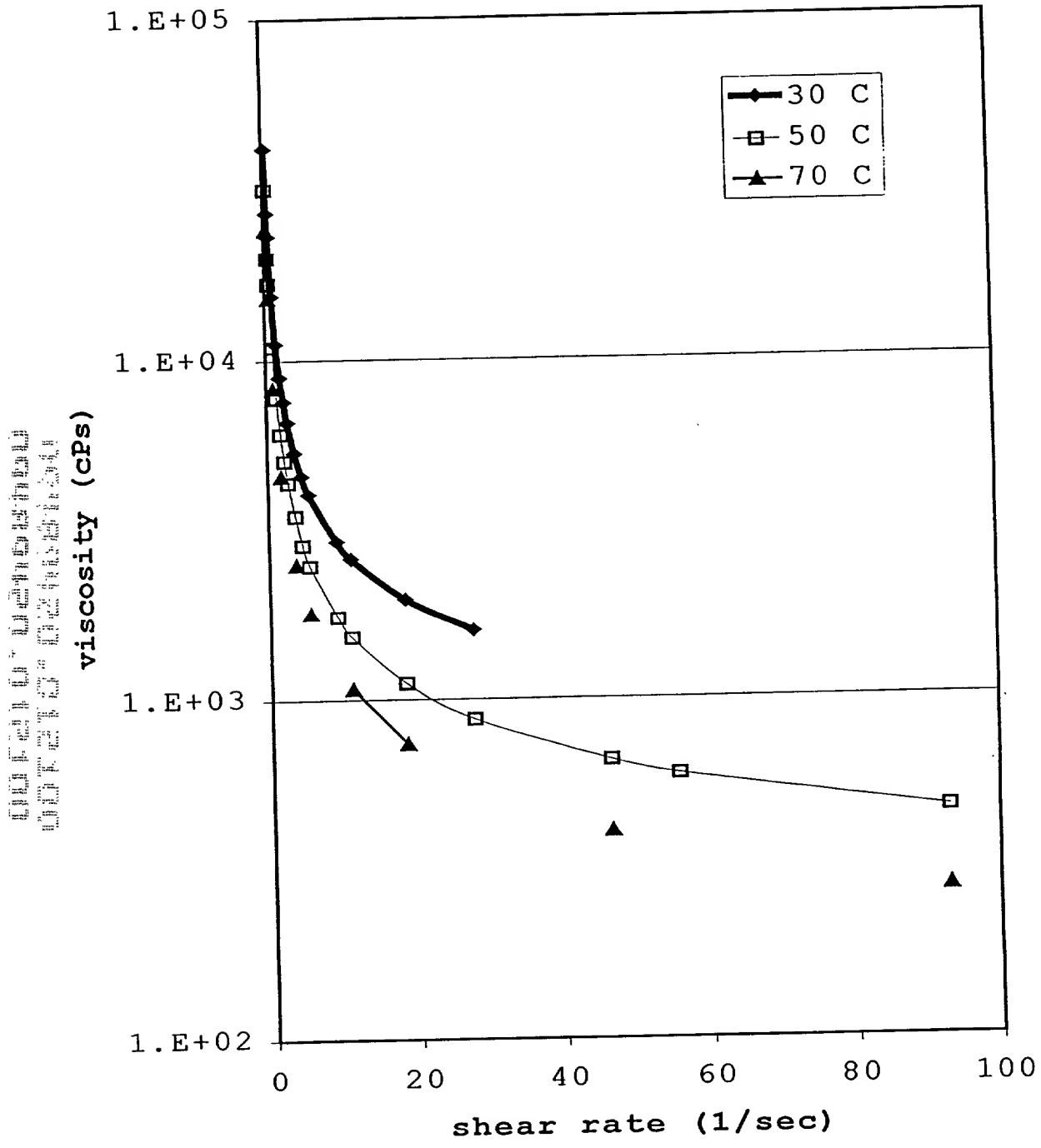

1.E+05
1.E+04
1.E+03
1.E+02
viscosity (cPs)
30 C
50 C
70 C
0
20
40
60
80
100
shear rate (1/sec)

FIG. 5

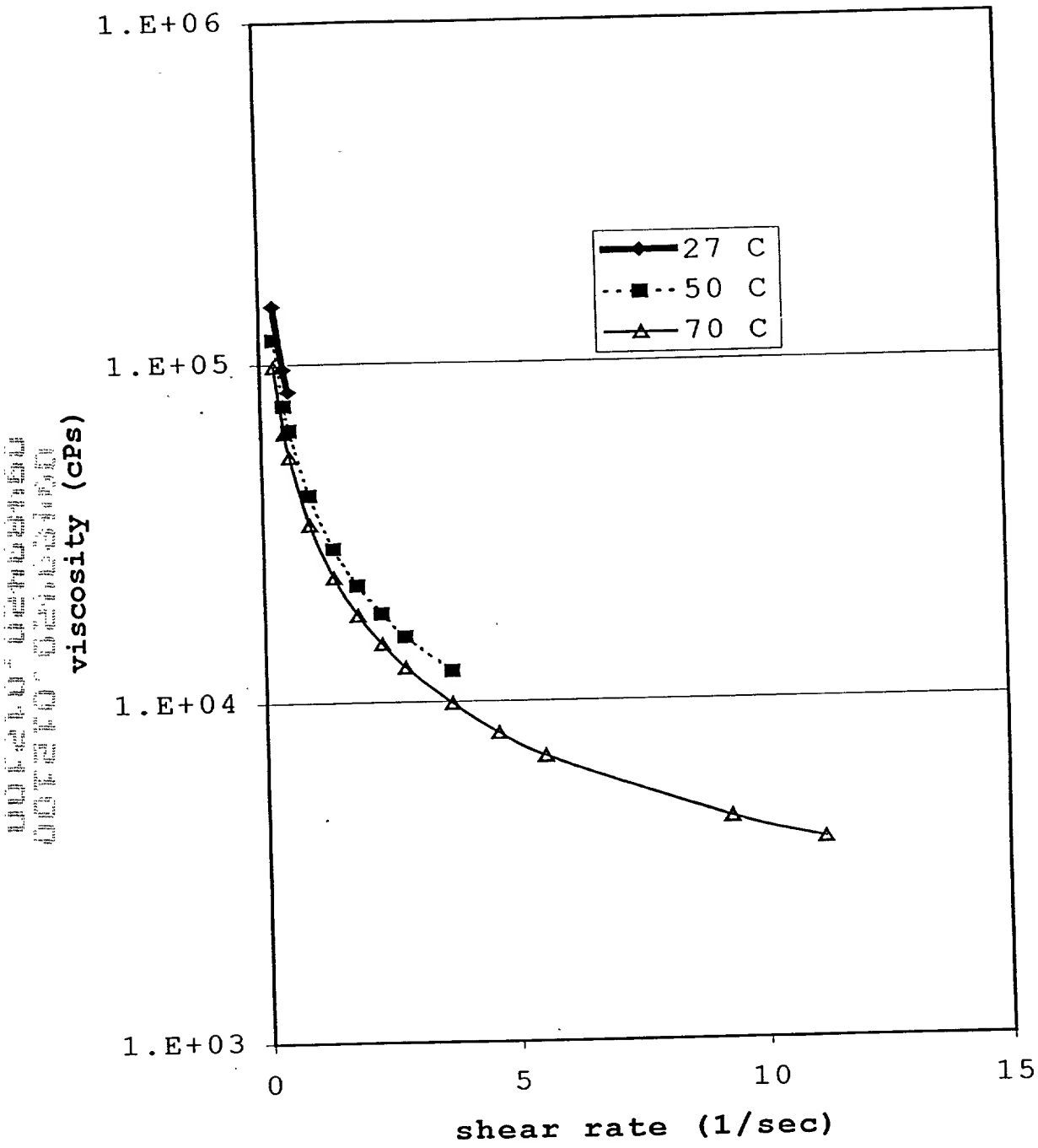

1.E+06
1.E+05
1.E+04
1.E+03
viscosity (cPs)
27 C
50 C
70 C
0
5
10
15
shear rate (1/sec)

FIG. 6

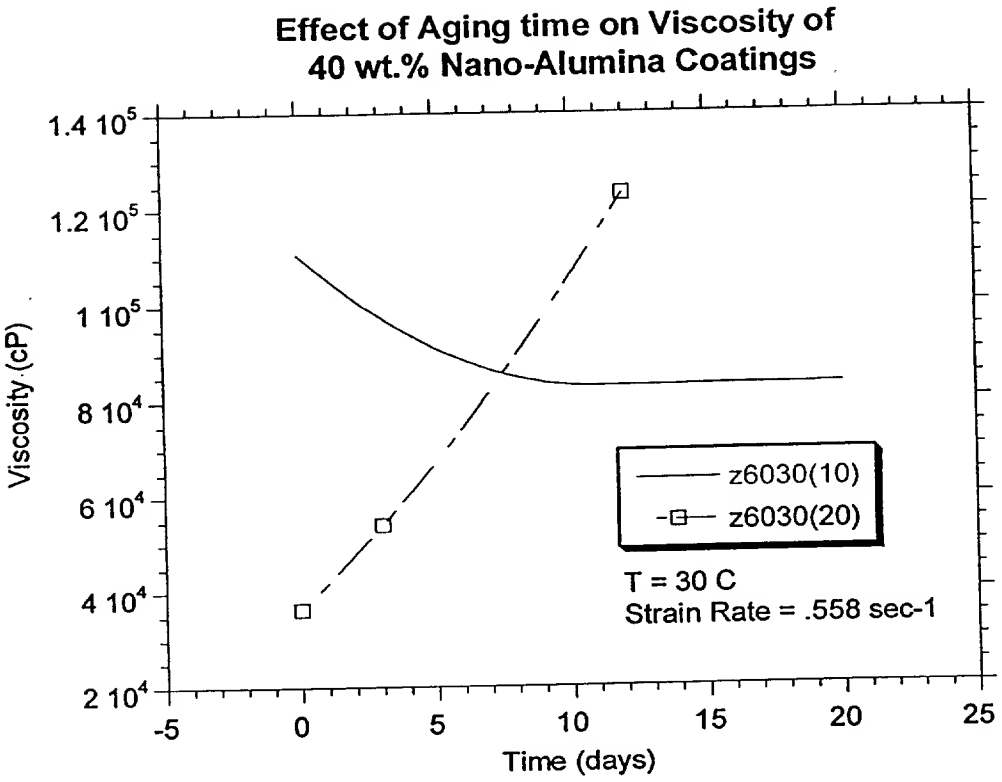

Effect of Aging time on Viscosity of
40 wt.% Nano-Alumina Coatings
Viscosity (cP)
1.4 10^5
1.2 10^5
1 10^5
8 10^4
6 10^4
4 10^4
2 10^4
-5
0
5
10
15
20
25
Time (days)
z6030(10)
z6030(20)
T = 30 C
Strain Rate = .558 sec-1

FIG. 7

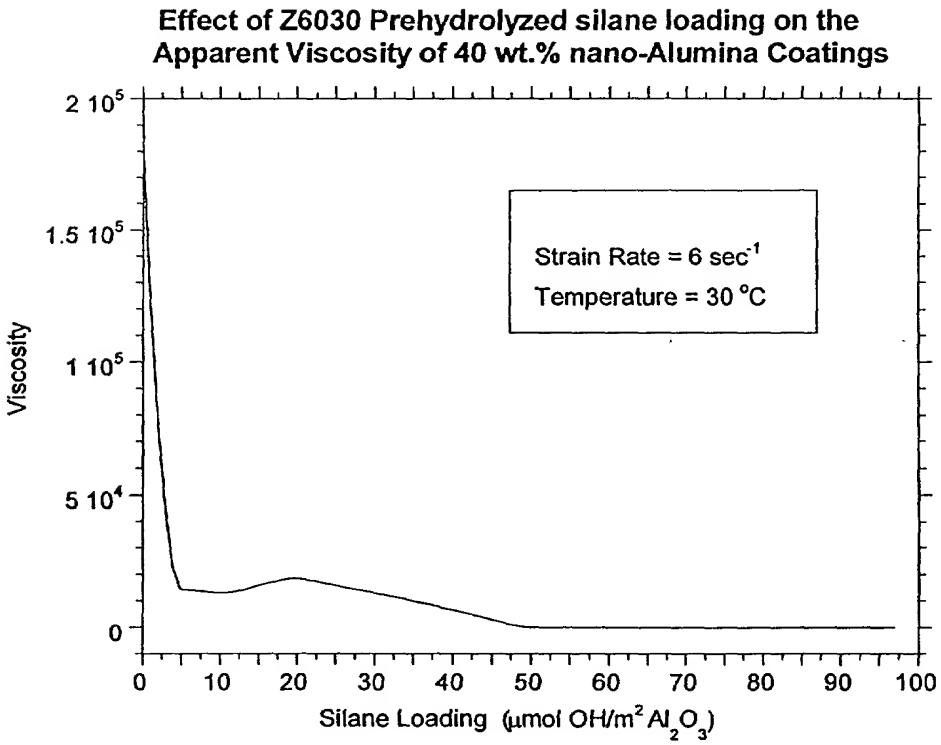

Effect of Z6030 Prehydrolyzed silane loading on the Apparent Viscosity of 40 wt.% nano-Alumina Coatings
Viscosity
2 10^5
1.5 10^5
1 10^5
5 10^4
0
Strain Rate = 6 sec^-1
Temperature = 30 °C
0
10
20
30
40
50
60
70
80
90
100
Silane Loading (µmol OH/m^2 Al2O3)

FIG. 8

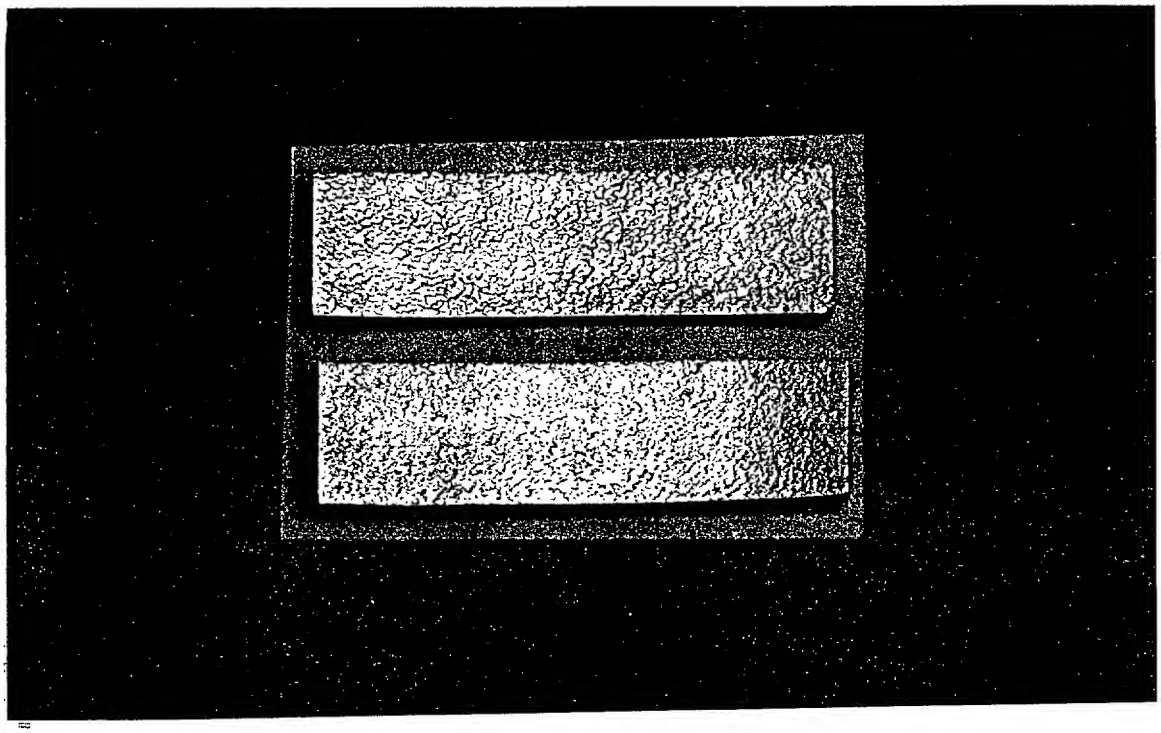


FIG. 9

FIG. 10

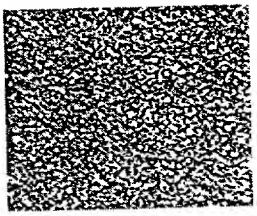


FIG. 11

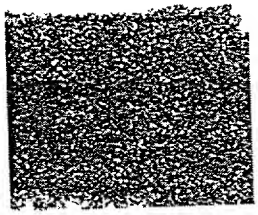


FIG. 12

FIG. 13

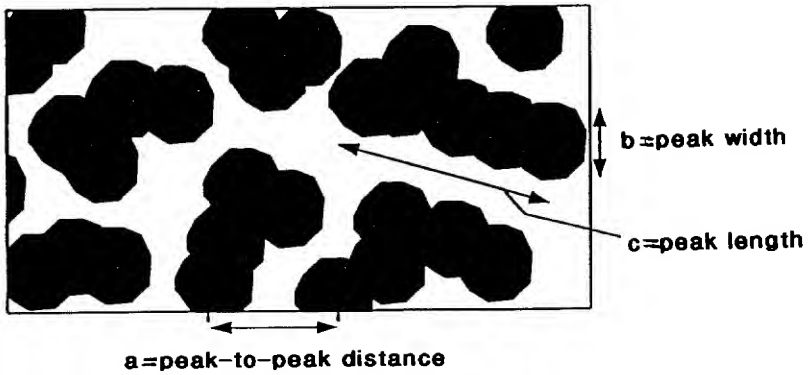


FIG. 14

FIG. 15

FIG. 16

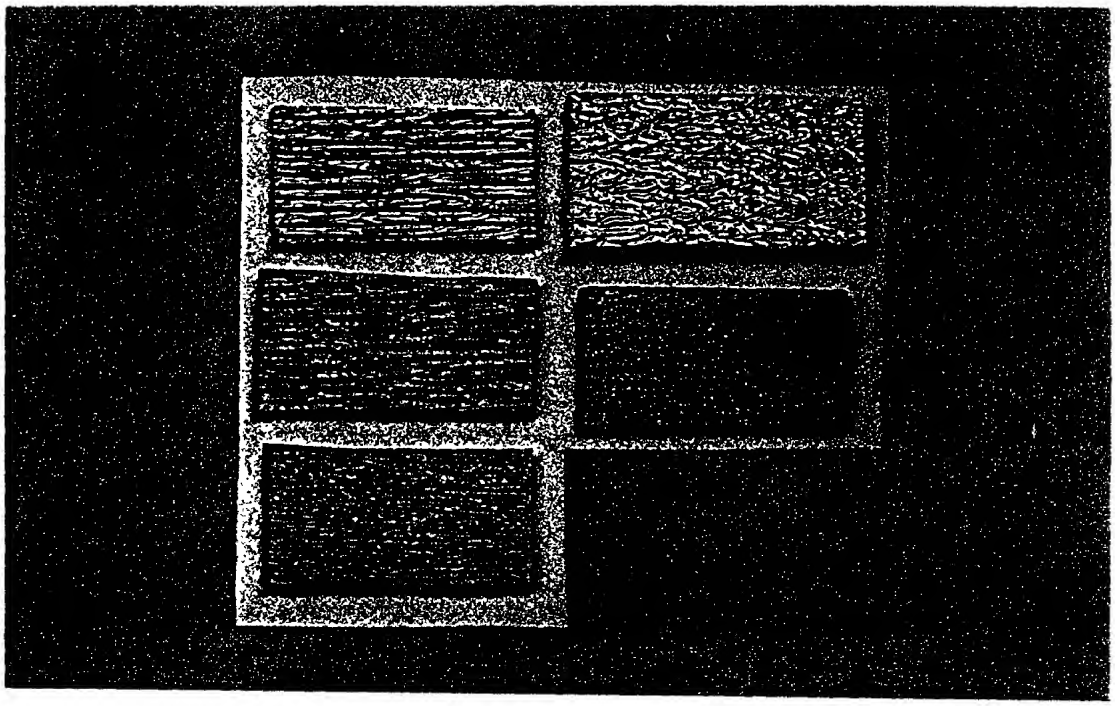


FIG. 17

FIG. 18

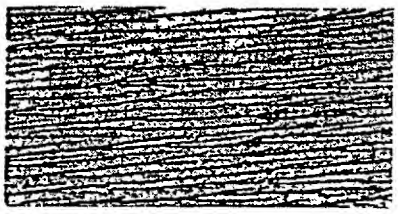


FIG. 19

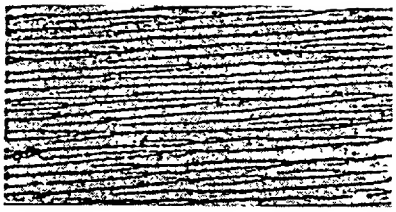


FIG. 20

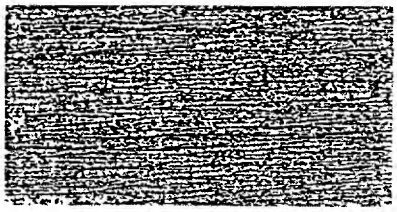


FIG. 21

FIG. 22

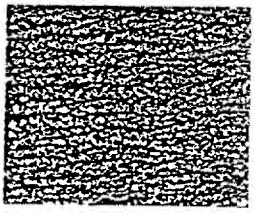


FIG. 23

FIG. 24

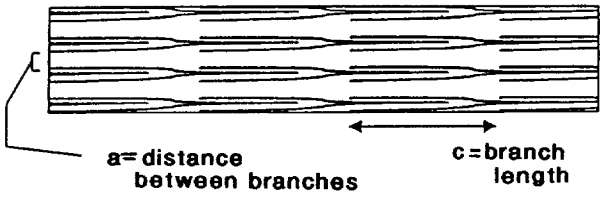


FIG. 25

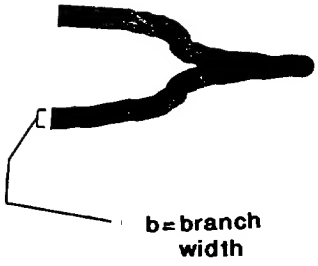
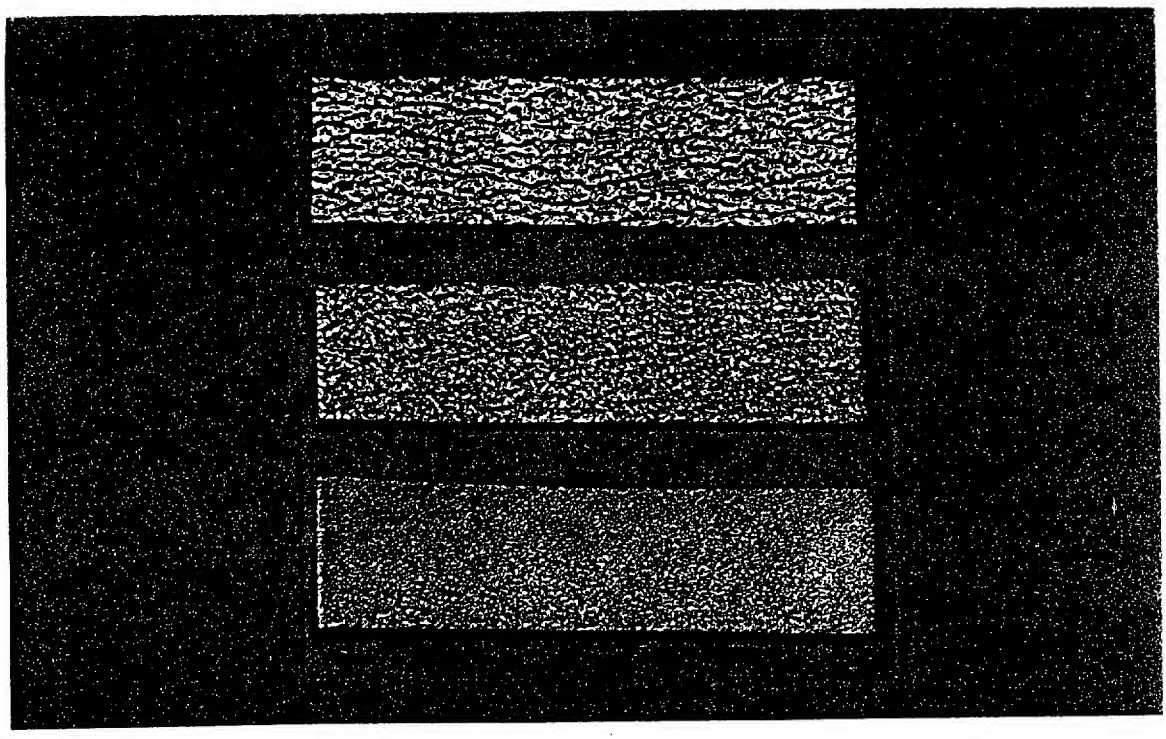


FIG. 26

FIG. 27

FIG. 28



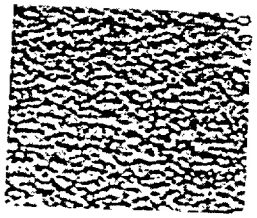


FIG. 29

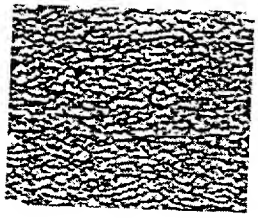


FIG. 30

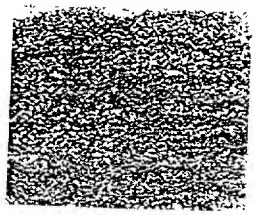
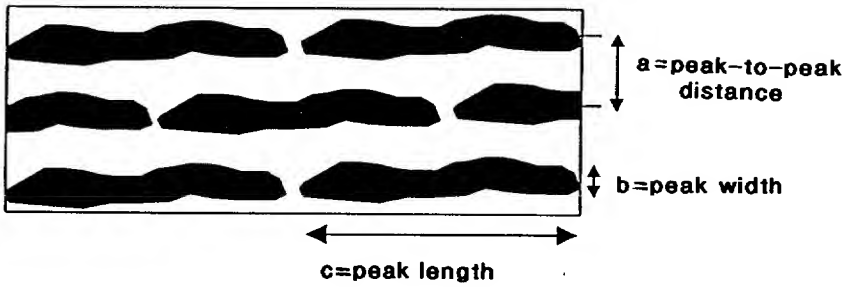


FIG. 31

FIG. 32



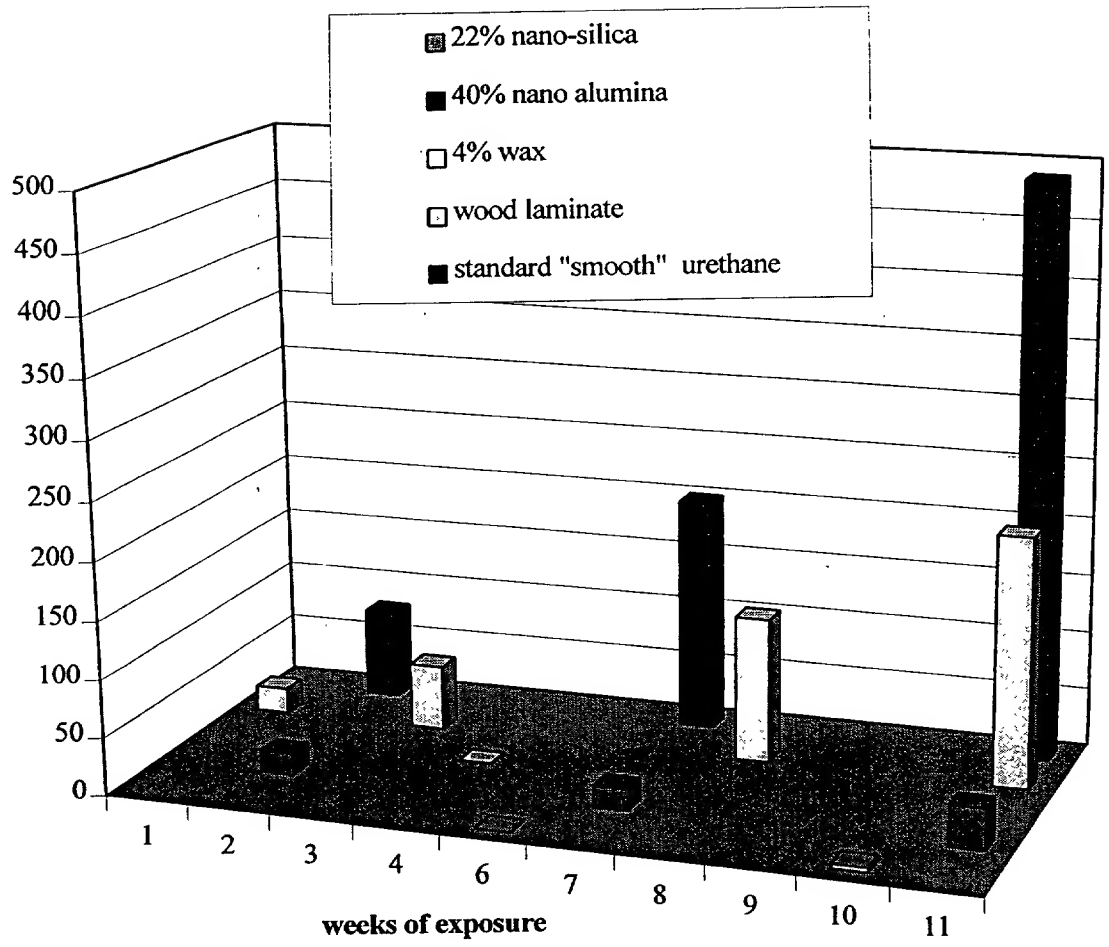

22% nano-silica
40% nano alumina
4% wax
wood laminate
standard "smooth" urethane
number of scratches per square foot (cummulative)
500
450
400
350
300
250
200
150
100
50
0
1
2
3
4
6
7
8
9
10
11
weeks of exposure

FIG. 33